Section 6

Graphic Concepts

6.1 **Line Work Delineation.** Proper line work graphic delineation is essential to prepare contract drawings. The Jacksonville District and all agencies under contract to the Jacksonville District are required conform to the A/E/C CADD Standard ERDC/ITL TR-01-06, chapter 3 "Graphic Concepts" http://www.saj.usace.army.mil/cadd/end/caddmanagementandsupport.htm. The line types specified by the A/E/C CADD Standard ERDC/ITL TR-01-06 are included in the tsaec.rsc file for Microstation users and tsaec.lin for AutoCAD users. All line work elements in the drawing are created on the specified level using a line weight, line style, and color according to appendix F of this document.

6.2 **Line Types/Styles.**

6.2.1 *Centerlines.* Centerlines should extend uniformly and distinctly a short distance beyond the object or feature of the drawing unless a longer extension is required for dimensioning or for some other purpose.

6.2.2 *Dimension Lines*. Dimension lines are used to indicate the extent and direction of dimensions and are normally terminated with arrowheads.

6.2.3 *Extension Lines*. Extension lines are used to indicate the point or line on the drawing to which the dimension applies.

6.2.4 *Leader Lines*. Leader lines are used to direct notes, dimensions, or symbols on the drawing. A leader is a straight inclined line, not vertical or horizontal, except for a short horizontal portion extending to the center of the height of the first or last letter or digit of the note. Leader lines should not be bent in any way unless unavoidable. Terminate leader lines with: a loop if they end on a dimension line; with a dot, if they end within outlines of an object; with an arrowhead, if they end on the outline of an object.

6.2.5 *Hidden Lines*. Hidden Lines is a line style 2 with a line weight of 2. The hidden line is used to depict features that are not visible in the drawing view.

6.2.6 *Patterning*. Cross-hatching, patterning, pouche lines are line style 0 with a line weight of 0.

6.2.7 *Cutting Plane*. Cutting plane line is a phantom style 6 and a line weight of 5. Cutting plane lines are used with section bubbles to indicate the perpendicular cutting plane passing through the drawing view.

6.2.8 *Freehand Break Line*. Freehand break line is a solid line of line style 0 and a line weight of 5. A freehand break line is used to provide a local parallel cutting plane to depict objects located within the interior of a major feature.

6.2.9 *Phantom Line*. Phantom line is line style 6 and a line weight of 1. Use a phantom line to show an alternative location of movable parts, object features being shown in the view for reference purposes only, or existing objects not included in the current project, but could affect the contract.

6.2.10 *Object Lines*. An object line is a solid line of line style 0 and a line weight of 2, 3, or 5. Object lines are used for representing visible edges or shape of an object.

6.3 **Line Color.** The default color table supplied with Microstation shall be used for the creation of all drawings.

6.4 **Text Styles/Fonts.** The text styles/Fonts are required to conform to the AEC CADD requirements of table 3-5 and as set forth in Chapter 3, Graphic Concepts of the AEC CADD Standard.

6.5 **Dimensions and Leaders**.

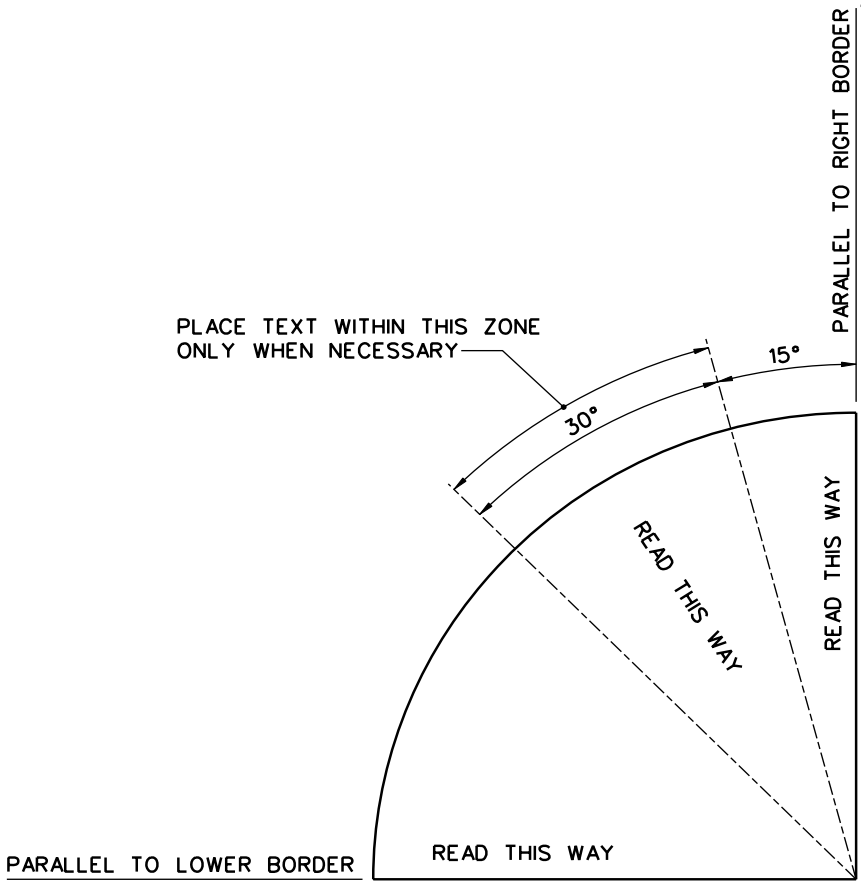
6.5.1 *Dimension Lines*. In Architectural and Civil Works drafting the dimension line shall be a continuous, solid, line weight 0.25 mm line placed between the extension lines with filled arrow terminators at both ends. The dimension line nearest the outer most object line should be 3/8" to 1/2" from the object line. All succeeding parallel dimension lines should be 3/8" apart. The spacing of parallel dimension lines shall be uniform throughout the drawing.

6.5.2 *Extension Line***.** An extension line is a line width of 0.25 mm solid line (weight 2) that "extends" from a point on the drawing to which the dimension refers. A gap of about half of the text size should be left where the extension line would join the object outline. The extension line should extend about equal to the text size beyond the dimension line. A centerline may be used as an extension line for dimensioning purposes. This commonly occurs when symmetrical, spherical, or center features are being dimensioned.

6.5.3 *Placement of Dimension and Extension Lines*. The shorter dimensions are nearest the object line. Dimension lines should not cross extension lines. It is permissible for extension lines to cross over each other. Dimension lines should not cross over each other. Dimension lines shall not overlay or be a continuation of any object line. Dimension should be aligned and grouped together as much as possible. Where a leader line crosses a dimension line the dimension line shall be continuous and the leader line shall be broken at the point it crosses the dimension line. Should an extension line cross a leader line both will be shown as solid continuous lines.

6.5.4 *Dimension Line Terminators*. There are two allowable terminators used with dimension lines. The primary terminator is a closed filled arrowhead. As an alternative a

solid dot may be used where space does not allow use of an arrowhead. All arrowheads shall have a length equal to 1.5 times the text size and a width of 1/2 (0.5) the text size. Solid dot terminators shall have a diameter equal to 1/2 (0.5) of the text size.

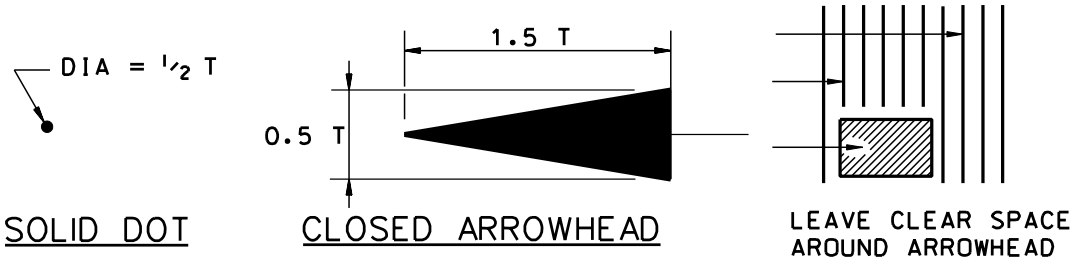


NOTE:

1. A DRAWING SHOULD BE LETTERED SO AS TO BE PROPERLY READ WHEN OBSERVED FROM THE LOWER BORDER.

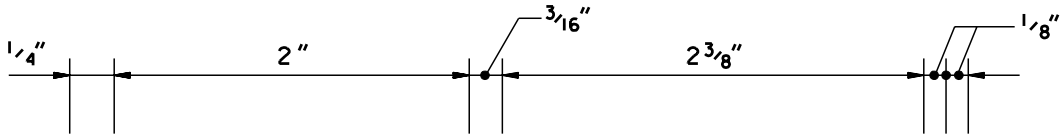
2. REQUIRING THE READER TO TURN THE DRAWING TO READ DIMENSIONS AND LOCAL NOTES SHOULD BE AVOIDED IF POSSIBLE.

Figure 6-1

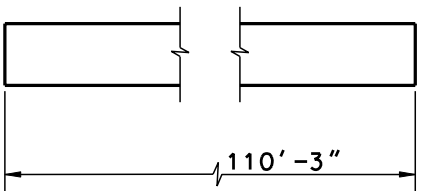


TERMINATORS

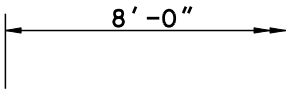
NOTE: "T" EQUALS TEXT SIZE



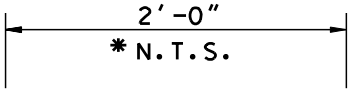
STANDARD DIMENSIONING



BROKEN DIMENSION LINE



FOR CONTINUATION

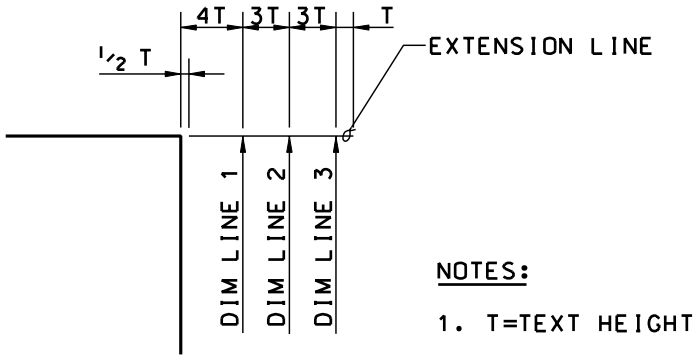


* NOT TO SCALE
USE WHEN REQUIRED

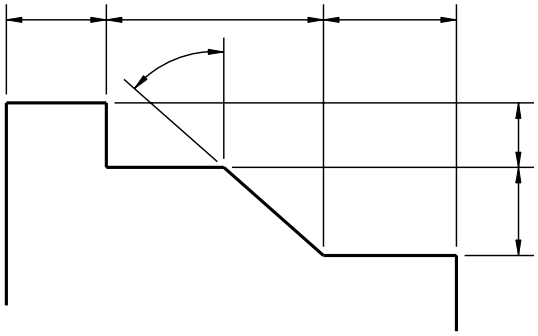
DIMENSIONING IN CROWDED AREAS

DIMENSIONS

Figure 6-2

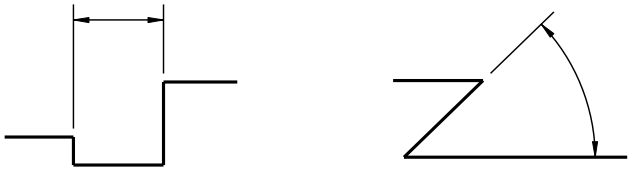


DIMENSION AND EXTENSION LINE SPACING



NOTES:

1. DO NOT BREAK EXTENSION LINES THAT CROSS OTHER EXTENSION LINES OR DIMENSION LINES.



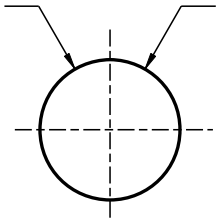
USE OF EXTENSION LINES

Figure 6-3

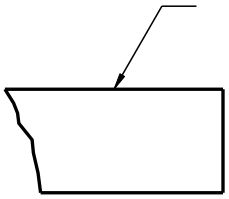
6.5.5 *Leaders*. A leader line is a solid, 0.25 mm weight, continuous line leading from a local note or dimension to an object line, ending in a terminator. In Architectural and

Civil Works drafting there are three allowable terminators for leader lines, closed filled arrowhead, solid dot, and a loop. When the leader refers to a geometric shape or feature the leader line should terminate in a closed filled arrowhead touching the object line. When the leader line refers to an area inside a geometric shape or feature, the leader line shall terminate in a solid dot. If the leader line is referring to a linear feature or object the leader line shall terminate in a loop.

6.5.6 *Leader Line Composition*. All leader lines shall be composed of one element with two or three segments. As a minimum each leader line shall have a leader shoulder consisting of a horizontal line about twice the text size in length and one or two straight leader lines going from the leader line shoulder to the object line. There shall be a half text size gap between the note text and the leader line shoulder. The leader line shoulder shall begin at mid height of the note text at the beginning or end of the note for single line text. If the note has multiple lines of text leader lines to the left shall have the leader line shoulder start at mid height of the top line of text and continue start at mid height of the bottom line of text and continue on to the right side of the note. For multiple line notes with a right side leader line the leader line shoulder may be longer than twice the text size and should be as long as required.



LEADERS TO CIRCLES SHALL BE IN RADIAL DIRECTIONS

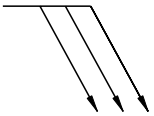


LEADERS SHALL BE AT A 30°-60° ANGLE TO OBJECT SURFACE

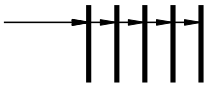
SINGLE ELEMENT, TWO SEGMENT LEADER

MULTIPLE ELEMENT, THREE SEGMENT LEADER

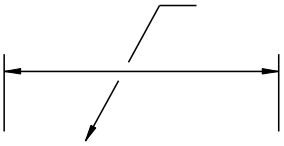
SINGLE ELEMENT, THREE SEGMENT LEADER



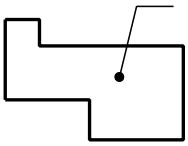
MULTIPLE ELEMENT, MULTIPLE SEGMENT LEADER



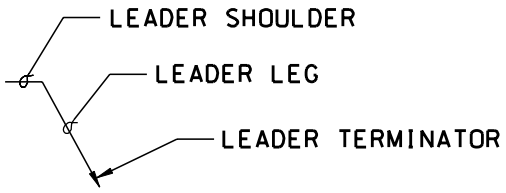
CONTINUOUS LEADER



BREAK LEADER LINE AROUND DIMENSION LINE



LEADER USED TO NOTE AN AREA



LEADER LINE CONVENTION

Figure 6-4

6.5.7 *Leader Line to a Circle*. A leader to a circle should point to the center of the circle but terminate at the circle object line. Leader lines in proximity to each other should be drawn parallel to each other. Leaders should cross as few lines as possible. If a leader line must cross a dimension line the leader line shall be broken at the crossing point. Leader lines shall not cross each other. Leader lines must not be drawn parallel to object or centerline. Do not draw excessively long leader lines, instead repeat the note and leader line as many times as required to adequately explain the feature.

6.5.8 *Direction of Dimension Figures and Text*. The aligned system of directions shall be used for Architectural and Civil Works drawings. All dimension figures are aligned with the dimension line so that they may be read from the bottom of the drawing or the right side of the drawing. Dimensions and notes with attached leader lines shall always be aligned with the bottom of the drawing.

6.5.9 *Dimension Figures*. Inches are indicated by the symbol ', such as 5'-9". For metric drawings it is standard practice to eliminate the mm suffix unless confusion could occur. If meters and millimeters are used on the same drawing all meter dimensions will include the suffix m after the numeral and millimeter dimensions will have the suffix mm after the numeral.

6.5.10 *Arc Dimensioning*. A circular arc is dimensioned in the view in which its true shape is shown by giving the numerical value of its radius, followed by a space and the abbreviation R, such as 11'-3" R. For metric drawings the abbreviation R shall proceed the numerical valued without a space between them, such as R 28.5. The centers of arcs may be marked with a small cross; normally each leg of the cross will be twice the text size. The preferred method to dimension an arc is to place both the dimension line and dimension figure inside the arc, with the dimension line going from the arc center to the object line. If space is limited the dimension line may be placed inside the arc with the text outside of the arc.

6.5.10.1 For very small arcs or if space is severely restricted arcs may be dimensioned by use of a leader line.

6.5.10.2 For arcs of very large radii the arc may be dimensioned by the use of a false center. A center mark is placed in the direction of the truce center, but within the allowable drawing area. A dimension line is the started at the false center but is "jogged" or "zigzagged" before touching the arc object line. The dimesionsion figure is then placed over a straight portion of the jogged dimension line.

6.5.11 *Dimensions On or Off Views*. Dimensions should not be placed upon a view unless doing so promotes the clearness of the drawing. The ideal form is to have all dimensions and notes placed outside the graphic view. Place dimensions outside of the graphic view where they will be closer to the features dimensioned. This must be done particularly for complicated drawings.

6.5.12 *Dimensioning of Holes*. A standard note with attached leader line usually specifies the size of a hole. The leader of the note is drawn pointing towards the center of the hole but terminates at the hole object line with a closed filled arrowhead. The dimension figure of a hole note shall consist of the numerical value followed by a space and the abbreviation DIA, such as 4'-3" DIA or 1-1/2" DIA. For metric drawings, the diameter symbol shall precede the numerical value within the dimension figure, shown as Ø 54.

6.6 **Notes**. It is usually necessary to supplement the graphics and direct dimensions with notes. Notes shall be concise statements using the simplest words and phrases for conveying the intended meaning. Indefinite terms such as "and/or", "etc.", "e.g." and "i.e." shall not be used. Use commas to separate blocks of three digits or any number with four or more digits.

6.6.1 *Citing Reference Documents*. Reference documents shall be cited using "per", "conforming to", "as specified", and "in accordance with". The word "shall" establishes a mandatory requirement. The word "will" establishes a declaration of purpose on the part of the design agency. The words "should" or "may" are used when it is necessary to express nonmandatory provisions.

6.6.2 *Space Utilization*. To save space do not use a period after commonly abbreviated words such as max, min, typ, spa, etc. Use a period only after abbreviations that spell a word, such as no., and abbreviations that are not commonly recognized. The ampersand symbol shall not be used in titles, subtitles, and notes, always use the word "and". Refer to the Uniform Drawing System and ANSI Y1.1 for standard abbreviations.

6.6.3 *Note Classification*. Notes are classified as General Notes when it applies to an entire drawing and as Local Notes when they apply to specific items. Requirements specified by local notes apply only to the areas or points indicated or called out in the note. Keynotes are notes that apply only to the area or point of application but are too lengthy or complicated to place within the graphic area. General notes are grouped together and presented in paragraph form while local notes and keynotes are used in conjunction with leader lines.

6.6.4 *General Notes*.

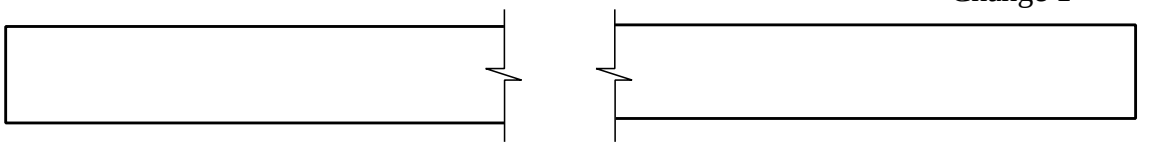
6.6.4.1 General notes shall be numbered consecutively as a single list starting with 1. Note numbers of deleted notes shall not be reused after plans and specifications have been issued for solicitation and have inserted in place of the deleted note "not used".

6.6.4.2 Reference to standardization or other technical documents shall be by basic identifier, excluding revision level, except where identification of a specific issue is essential to drawing interpretation.

6.6.4.3 Notes shall not include contractual requirements, such as statements of costs; time and place of delivery; methods of payment; and requirements for submission, approval, or distribution of data or reports.

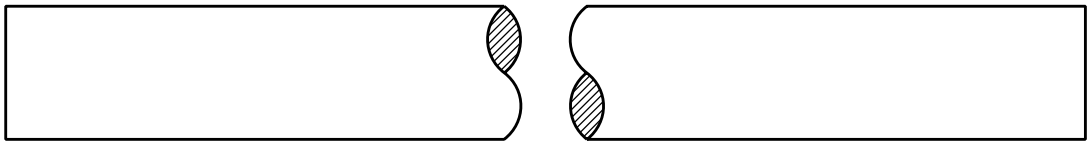
6.6.4.4 General notes, keynotes, and local notes shall use a justification of top-left.

a. All general notes shall be numbered.
b. Standard punctuation and grammar rules apply.
c. For multi line notes the second and successive lines shall be indented to show they belong to the same note.

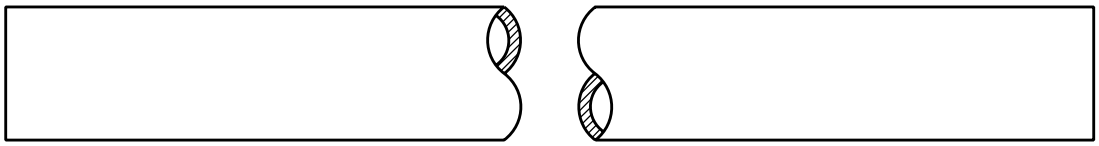


LONG BREAK LINE

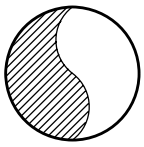
SHORT BREAK LINE



SOLID ROUND BREAK LINE



CYLINDER BREAK LINE



CYLINDER BREAK LINE
PARALLEL TO VIEWING PLANE

NOTE:

1. THIN BREAK LINES SHALL BE A LINE WEIGHT OF 0.25mm. LENGTH OF THE BREAK ZIGZAG IS 1 TO 1.25 TIMES THE TEXT SIZE.

2. SHORT BREAK LINES SHALL BE A LINE WEIGHT OF 0.50mm. HEIGHT OF THE HEIGHT OF THE BREAK LINE IS 1 TO 1.25 TIMES THE TEXT SIZE.

3. SOLID ROUND BREAK LINES AND CYLINDER BREAK LINES SHALL HAVE A LINE WEIGHT EQUAL TO THE ADJOINING OBJECT LINE. ANY PATTERNING OR POUCHE USED IN THE BREAK SHALL HAVE A LINE WEIGHT OF 0.18mm.

Figure 6-5

6.6.5 **Local Notes**.

6.6.5.1 Local notes should be located as close as possible to the object it is describing.

6.6.5.2 Local notes should be connected to the object by a leader line with the correct terminator.

6.6.5.3 Avoid excessively long leader lines by repeating the note at each location it is required.

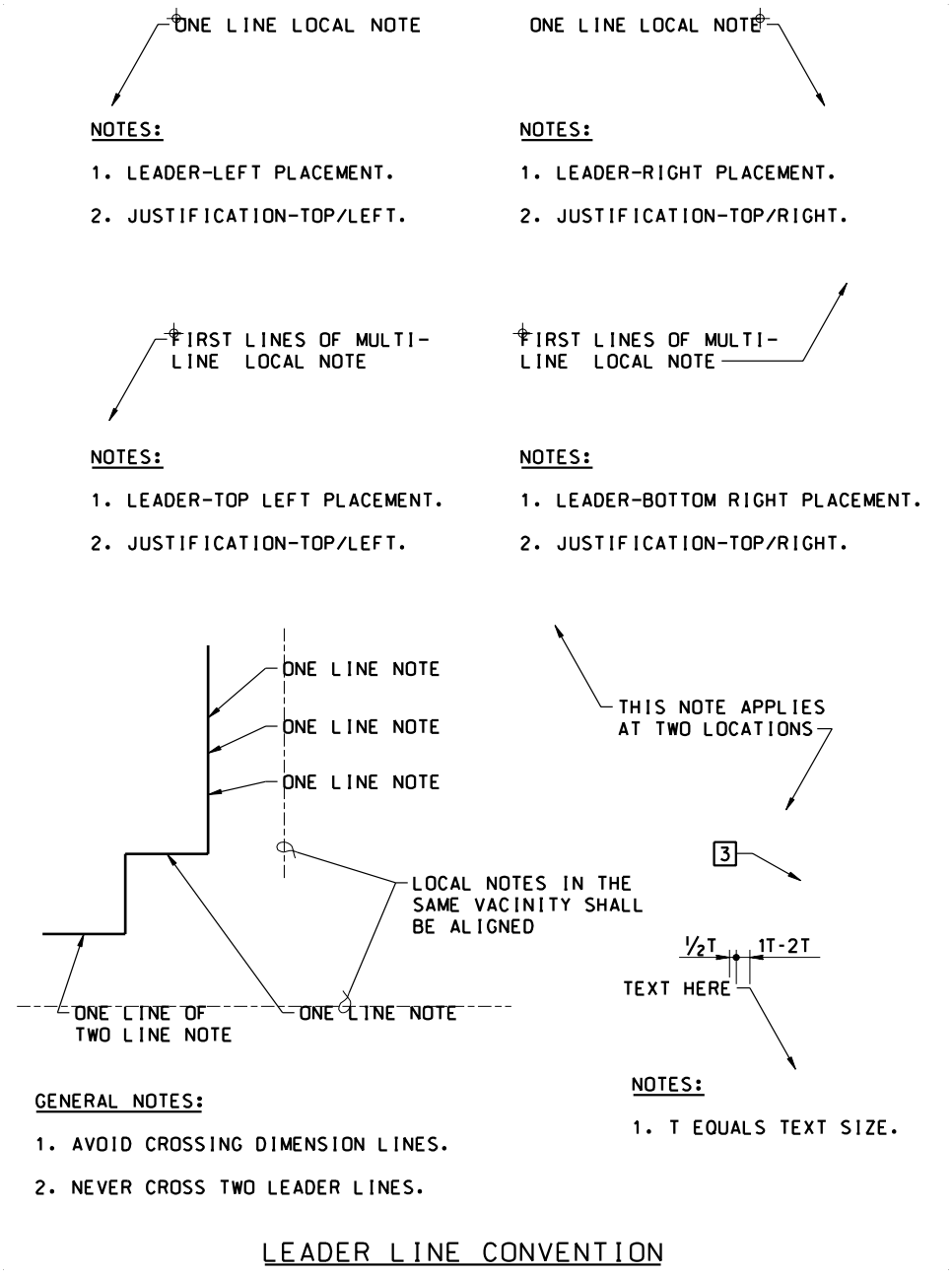


Figure 6-6

6.7 **Lettering**. Lettering on drawings shall be legible and scaled correctly to the full size plotted drawing. Either inclined or vertical lettering shall be used based upon the subject matter. The preferred slope for the inclined letters is 5 in 2 or about 68 deg. Uppercase letters shall be used for all lettering on drawings unless the subject matters requires otherwise.

6.8 **Text Height**.

Text Feature	A&B [1]		D, E, & F [1]	
Size	Size	Weight	Size	Weight
General Notes	0.080"/#80	0.25mm	0.125"/#125	0.25mm
Text & Local Notes	0.080"/#80	0.25mm	0.125"/#125	0.25mm
Dimensions	0.080"/#80	0.25mm	0.125"/#125	0.25mm
Symbology Data Fields	0.080"/#80	0.25mm	0.125"/#125	0.25mm
Headings	0.100/#100	0.25mm	0.140/#140	0.25mm
Subtitles	0.125"/#125	0.35mm	0.175"/#175	0.35mm
Titles	0.175"/#175	0.50mm	0.200"/#200	0.50mm
Status Markings	0.125"/#125	0.35mm	0.175"/#175	0.35mm

[1] Drawing Size Identification

Table 6-1

6.9 **Feature Designations**.

6.9.1 *Planimetric*.

Bench Mark Designations
Cemeteries
Dimensions
Highway Symbol Numbers
Island Names
Legends
Match Lines
Navigation Aids
Property Corners
Public Unities
Scales
Street Titles
Township & Range
Building Names
County Names
Grid Designations
Highway, Road & Trail Names
Plateaus
Limits of Construction
Monuments
Notes
Proposed Works
Railroad Names
State Names
Town Names
Triangulation Stations

6.9.2 Hydrographic and Topographic.

Bays	*Bridges*
Causeways	*CANALS*
Coves	*Creeks*
Centerline Designations	*Channel Names*
Contour Numbers	*Cut Designations*
Dams	*Ground Elevations*
Inlets	*Jetty*
Lakes	*Levees*
Marshes	*Oceans*
Sounds	*Station & Ranges*
Structure Numbers	*Swamps*
Water Soundings	*River Names*
River Miles	*Project Depths*
Reservoirs	*Right-of-Way Designations*

6.10 **Examples of Symbology Data Fields**:

SLOPE (with symbol)
GRAPHIC SCALES (underlined)
NOTES: (underlined)
LEGEND: (underlined)
SYMBOLS: (underlined)

6.11 **Schedule and Table Column Headings**:

Section and detail sub-titles:
Schedule and table titles
Detail grouping title:
SLIDE GATE (double underlined)

6.12 **Markings**. Special item, management, and processes markings, for example:

SUPERSEDED
DUPLICATE ORIGINAL
CRITICAL SAFETY ITEM
AS-BUILT
REFERENCE DRAWING

6.13 **Border Sheets**

6.13.1 Based on the project type, full-size drawings can be developed as ANSI size (D or E). The standard size border is an ANSI D (22”x34”) border file. If the project is, a large civil project or navigation project then use the ANSI E (34”x44”) border.

All drawings shall utilize the standard Corps of Engineers Jacksonville District title block. Half-sized drawings of the ANSI-D size sheet are to be printed on ANSI-B size sheet (11”x 17”) plotted at 50%. Half-sized drawings of the ANSI-E size sheet are to be printed on ANSI-C size sheet (17”x 22”) plotted at 50%.

6.13.2 The standard Corps of Engineers Jacksonville District title block has been populated with placeholders for project and drawing information. Placeholders in the title block file are to be edited as appropriate for a specific project and each drawing.

6.13.3 Standard configuration areas of the border have been pre-set and are not to be changed.

6.13.3.1 Border line work; level: G-ANNO-TTLB; color varies. The normal status of this level is ON.

6.13.3.2 Corps logo; level: G-ANNO-SYMB; color varies. The normal status of this level is ON.

6.13.3.3. Border/title block text; level: G-ANNO-TEXT-TTLB; color yellow. The normal status of this level is ON.

6.13.3.4 Plot shape; level: G-ANNO-NPLT; COLOR 134, LINE 0, WEIGHT 0. The normal status of this level is on.

6.13.3.5 Neat image frame; level: G-ANNO-TTLB-FRME; color yellow. The normal status of this level is ON.

6.13.4 The project data editable border placeholders require editing for each project. Project specific title block text; level: G-ANNO-TEXT-PROJ; color green (2). The normal status of this level is ON.

6.13.5 The drawing data editable border placeholders require editing for each drawing.

6.13.6 Drawing data title block text; level: G-ANNO-TEXT-DRWG; color orange (6). The normal status of this level is ON.

6.14 **Border Referencing Procedure for Microstation Users**.

6.14.1 Copy the standard border file and place it in the project specific directory-using file naming standards.

6.14.2 Edit green text in G-ANNO-TEXT-PROJ and save. This text is common on all drawings in the same project (i.e. project name).

6.14.3 Then, reference this edited border file to each project drawing file.

After the border is referenced, copy text on G-ANNO-TEXT-DRWG, color orange (6) that describes drawing specific information (i.e. dwg no., dwg name, etc). To do this, copy these text elements into the active project drawing file and turn off G-ANNO-TEXT-DRWG in the referenced border file using the level manager.

6.15 **Plotting for Microstation users**:

6.15.1 Microstation users shall use the printer driver file named AEC_FULLrtl.plt to plot in accordance with the A/E/C CADD Standard ERDC/ITL TR-01-6.

6.15.2 Fence the trim line shape and plot fence element using ANSI-D or ANSI-E for full size and ANSI-B or ANSI-C for half size sheets.

6.15.3 The shape found around the trim line location of the border drawings is to use for batch plotting processes.

6.15.4 Don't change element attributes because they are critical for successful plotting procedures.

6.16 **Symbology Convention**

6.16.1 Symbols and conventions serve two purposes. One is to simplify the drawing and improve comprehension. The other is to follow or establish a national standard, which is easily recognized and acceptable. Symbols shall always be shown in the legend on the drawing where it is first used or on a general symbols, notes, and abbreviations drawing.

6.16.2 All symbology used to prepare contract drawings shall conform to the Tri-Service A/E/C CADD Standard; ERDC/ITL TR-01-6, Appendix D. Microstation users shall use the A/E/C CADD Standard ERDC/ITL TR-01-6 Symbols .dgn cell libraries. AutoCAD users shall use the A/E/C CADD Standard ERDC/ITL TR-01-6 Symbols .dwg files.

6.17 **Microstation Sheet File Element Size**

6.17.1 *Sheet Scale 1"=1'*
Text, Dimensions, and Notes: 0.125
Title: 0.2
Subtitle: 0.175
Section Callout (3/8"): 0.375, Dia.
Pay Item Mark (3/8"): 0.375, Square
Section/Elevation Bubble (5/8"): 0.625, Dia

6.17.2 *Sheet Scale 1"=5'*
Text, Dimensions, and Notes: 0.625
Title: 1.0
Subtitle: 0.875
Section Callout (3/8"): 1.875, Dia.
Pay item mark (3/8"): 1.875, Square
Section/Elevation Bubble (5/8"): 3.125, Dia.

6.17.3 *Sheet Scale 1"=10'*
Text, Dimensions, and Notes: 1.25
Title: 2.0
Subtitle: 1.75
Section Callout (3/8"): 3.75, Dia.
Pay Item Mark (3/8"): 3.75, Square
Section/Elevation Bubble (5/8"): 6.25, Dia.

6.17.4 *Sheet Scale 1"=20'*
Text, Dimensions, and Notes: 2.5
Title: 4.0
Subtitle: 3.5
Section Callout (3/8"): 7.5, Dia.
Pay Item Mark (3/8"): 7.5, Square
Section/Elevation Bubble (5/8"): 12.5, Dia.

6.17.5 *Sheet Scale 1"=30'*
Text, Dimensions, and Notes: 3.75
Title: 7.16
Subtitle: 5.25
Section callout (3/8"): 11.25, Dia.
Pay Item Mark (3/8"): 11.25, Square
Section/Elevation Bubble (5/8"): 18.75, Dia.

6.17.6 *Sheet Scale 1"=40'*
Text, Dimensions, and Notes: 5.0
Title: 8.0
Subtitle: 7.0
Section Callout (3/8"): 15.0, Dia.
Pay Item Mark (3/8"): 15.0, Square
Section/Elevation bubble (5/8"): 25.0, Dia.

6.17.7 *Sheet Scale 1"=50'*
Text, Dimensions, and Notes: 6.25
Title: 10.0
Subtitle: 8.75
Section Callout (3/8"): 18.75, Dia.
Pay Item Mark (3/8"): 18.75, Square
Section/Elevation Bubble (5/8"): 31.25, Dia.

6.17.8 *Sheet Scale 1"=100'*
Text, Dimensions, and Notes: 12.5
Title: 20.0
Subtitle: 17.5
Section Callout (3/8"): 37.5, Dia.
Pay Item Mark (3/8"): 37.5, Square
Section/Elevation Bubble (5/8"): 62.5, Dia.

6.17.9 *Sheet Scale 1/8"=1'- 0"*
Text, Dimensions, and Notes: 1:0
Title: 1:7
Subtitle: 1:5
Section Callout (3/8"): 3:0, Dia.
Pay Item Mark (3/8"): 3:0, Square
Section/Elevation Bubble (5/8"): 5:0, Dia.

6.17.10 *Sheet Scale 3/16"=1'- 0"*
Text, Dimensions, and Notes: 0:9
Title: 1:2
Subtitle: 1:0
Section Callout (3/8"): 2:3, Dia.
Pay Item Mark (3/8"): 2:3, Square
Section/Elevation Bubble (5/8"): 3:9, Dia.

6.17.11 *Sheet Scale 1/4"=1'- 0"*
Text, Dimensions, and Notes: 0:6
Title: 9.6
Subtitle: 0:8.4
Section Callout (3/8"): 1:6, Dia.
Pay Item Mark (3/8"): 1:6, Square
Section/Elevation Bubble (5/8"): 2:6, Dia.

6.17.12. *Sheet Scale 3/8"=1'- 0"*
Text, Dimensions, and Notes: 0:4
Title: 0:6.4
Subtitle: 0:5.6
Section Callout (3/8"): 1:0, Dia.
Pay Item Mark (3/8"): 1:0, Square
Section/Elevation bubble (5/8"): 1:8, Dia.

6.17.13 *Sheet Scale 1/2"=1'- 0"*
Text, Dimensions, and Notes: 0:3
Title: 0:4.8
Subtitle: 0:4.2
Section Callout (3/8"): 0:9, Dia.
Pay item Mark (3/8"): 0:9, Square
Section/Elevation Bubble (5/8"): 1:3, Dia. 6

6.17.14 *Sheet Scale 3/4"=1'- 0"*
Text, Dimensions, and Notes: 0:2
Title: 0:3.2
Subtitle: 0:2.8
Section Callout (3/8"): 0:6, Dia.
Pay Item Mark (3/8"): 0:6, Square
Section/Elevation Bubble (5/8"): 0:10, Dia.

6.17.15 *Sheet Scale 1"=1'*
Text, Dimensions, and Notes: 0:1.5
Title: 0:2.4
Subtitle: 0:2.1
Section Callout (3/8"): 0:4.5, Dia.
Pay Item Mark (3/8"): 0:4.5, Square
Section/Elevation Bubble (5/8"): 7.5, Dia

6.17.16 *Sheet Scale 1 1/2"=1'- 0"*
Text, dimensions, and notes: 0:1
Title: 0:1.6
Subtitle: 0:1.4
Section Callout (3/8"): 0:3, Dia.
Pay Item Mark (3/8"): 0:3, Square
Section/Elevation bubble (5/8"): 0:5, Dia.

6.17.17 *Sheet Scale 3"=1'- 0"*
Text, Dimensions, and Notes: 0:0.5
Title: 0:0.8
Subtitle: 0:0.7
Section Callout (3/8"): 0:1.5, Dia.
Pay Item Mark (3/8"): 0:1.5, Square
Section/Elevation Bubble (5/8"): 0:2.5, Dia.

6.18 **Title Block.** The vertical title block is placed in the right-hand margin of the border sheet as shown in Figure 4-7. Use of the vertical title block provides the most usable drawing space on a sheet. The vertical title block also ensures that the most prevalent and pertinent information remains at the bottom right of the sheet. The title block data will include the following:

- *Designer Identification Block*
- *Revision Block*
- *Image Block*
- *Management Block*
- *Project Identification Block/Sheet Title Block*
- *Sheet Identification Block*

6.18.1 *Designer Identification Block.* The designer identification block contains the logo or name of the agency that designed the sheet. This space could also be expanded (by reducing the size of the issue block) to accommodate professional seals when required.

6.18.2 *Revision Block.* The issue block contains a history of revisions, addenda, and/or clarifications to the sheet. The first entry should be placed on the lower left-hand line of the issue block and subsequent entries should be made above it.

6.18.3 *Image Block.* The image block is set to arrange images within the border. The image block after images are set shall be turned off from view.

6.18.4 *Management Block.* The management block contains information about the designer, reviewer, and submitter.

6.18.5 *Reference Files Block*. This block contains information to maintain filing information about the drawing, such as the file name.

6.18.6 *Project Identification Block/Sheet Title Block*. The project identification block/sheet title block contains two sets of information. First, the project name is identi-

fied by the name authorized by Congress, with the location or phase associated with a specific structure or reach of the project identified. If small enough, a project logo can be presented in this block. The second set of information contains a description of the content of the sheet (e.g., Architectural Floor Plan). If more than one type of information is presented on the sheet (i.e., plans, schedules, details), the most important information is identified.

6.18.7 *Sheet Identification Block*. The sheet identification block contains the sheet identifier. This sheet identifier is com-posed of the discipline designator, the sheet type designator, and the sheet sequence number described in the section, "Electronic Drawing File Naming Conventions" (Chapter 2). The "number of sheets" listing is optional and can contain either the total number of sheets for the entire project drawing set or the number of sheets for that particular discipline designator.

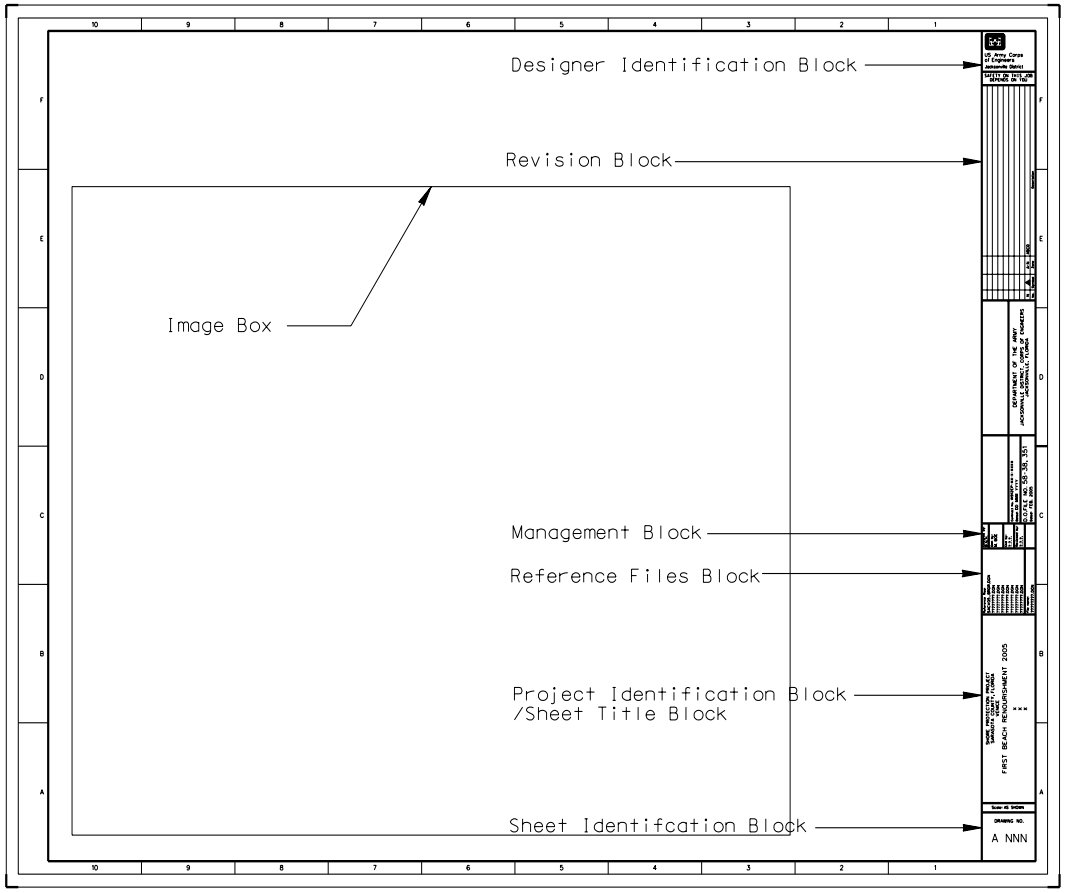
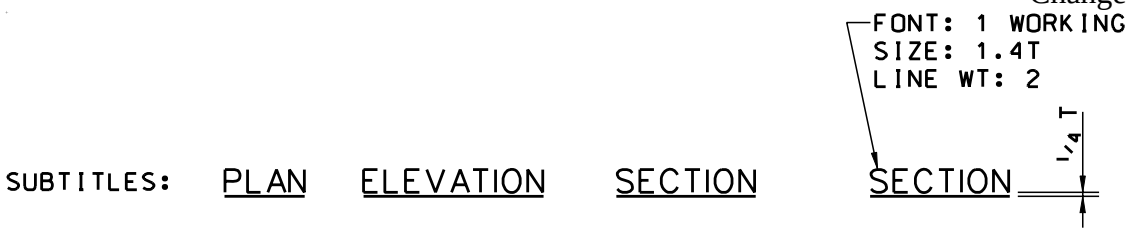


Figure 6-7

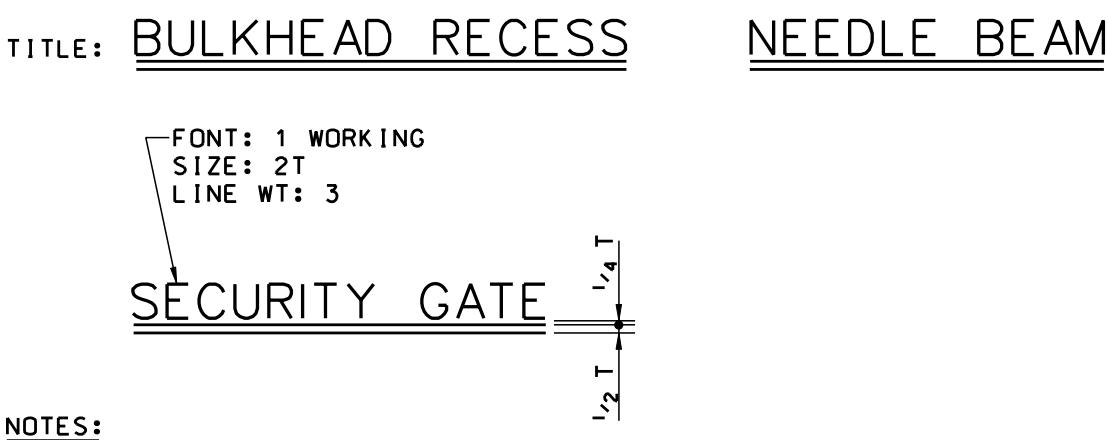
6.19 **Drawing Scales**. Typical drawing scales for both SI and inch-pound measurements are indicated in ERDC/ILT TR-01-6 Tables 13 and Table 14.

6.20 **Dual Units**. Only one unit system should be used on the projects.



NOTES:

1. WHEN ONLY ONE SUBJECT APPEARS ON A DRAWING, AND ITS TITLE APPEARS IN THE TITLE BLOCK, A SUBTITLE SHOULD BE SHOWN UNDER EACH VIEW OR DETAIL ON THE DRAWING.
2. T EQUALS TEXT HEIGHT.



NOTES:

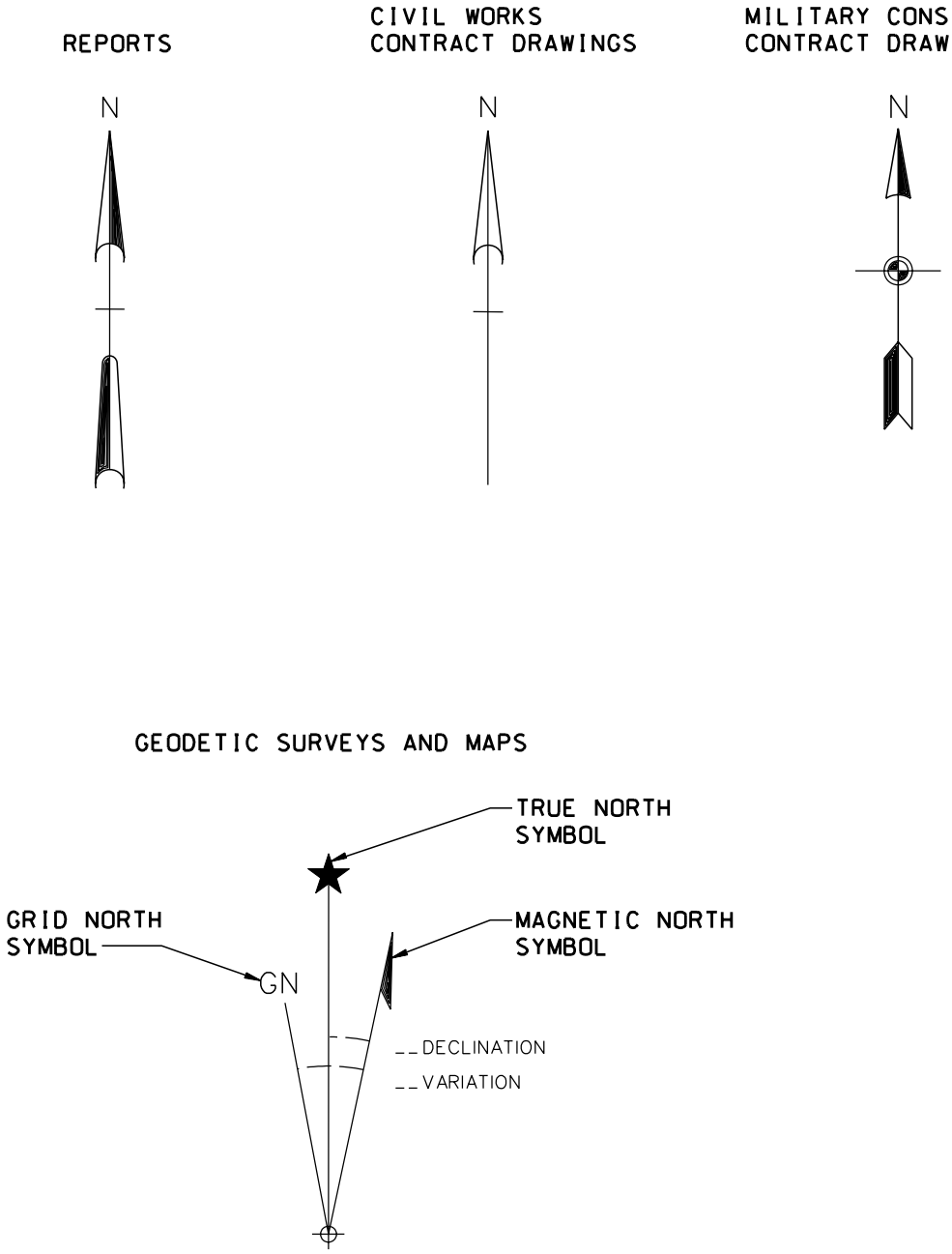
1. WHEN MORE THAN ONE SUBJECT APPEARS ON A DRAWING, A TITLE SHOULD BE SHOWN UNDER EACH SUBJECT. A SUBTITLE IS THEN PLACED UNDER EACH VIEW OR DETAIL OF THE SUBJECT
2. T EQUALS TEXT HEIGHT.

GENERAL NOTES:

1. SUBJECT TITLES AND VIEW SUBTITLES SHALL BE BRIEF AND SIMPLE.
2. CENTER ALL TITLES AND SUBTITLES BELOW THEIR SUBJECTS.
3. INDICATE UNDER EACH VIEW WHEN NOT DRAWN TO SCALE.

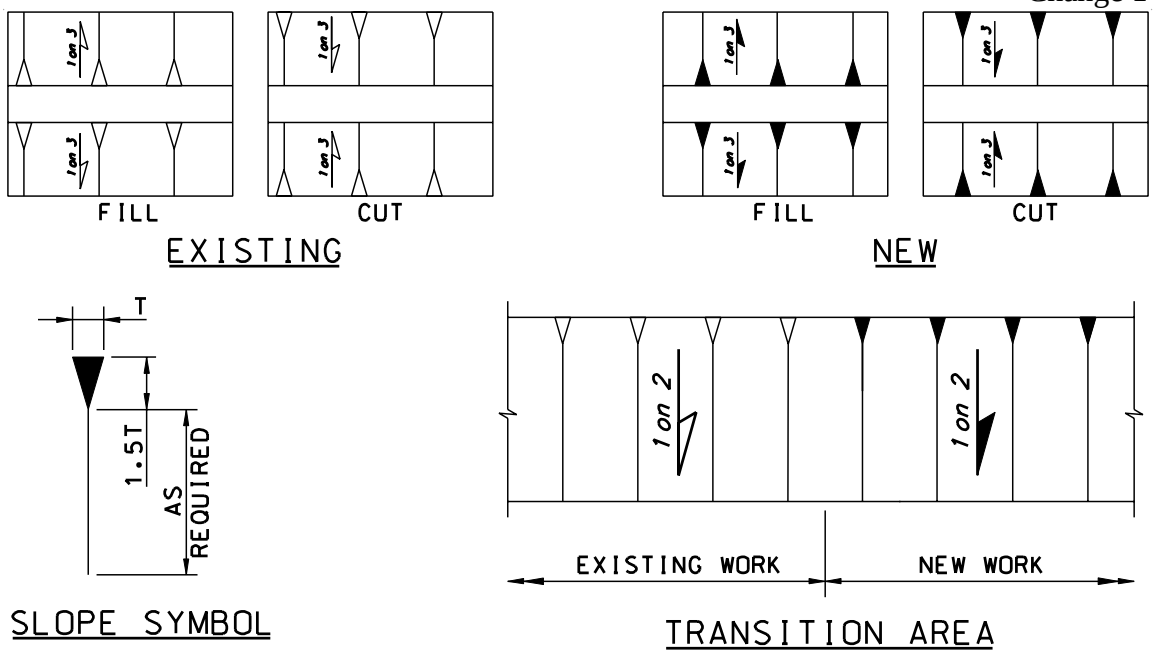
SUBJECT TITLES

Figure 6-8

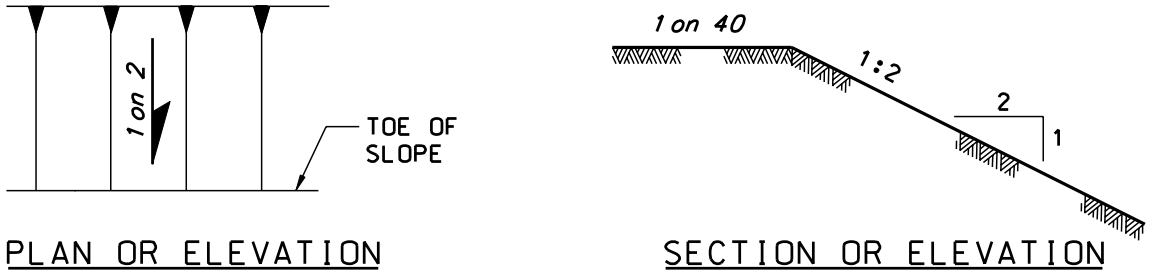


NORTH ARROW CONVENTIONS

Figure 6-9

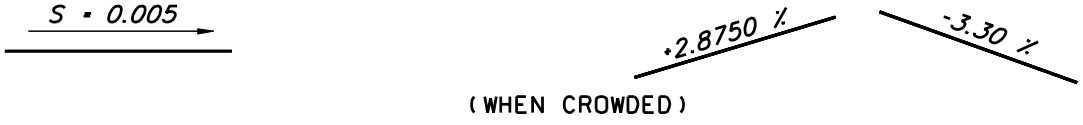


GRADE SYMBOLOGY



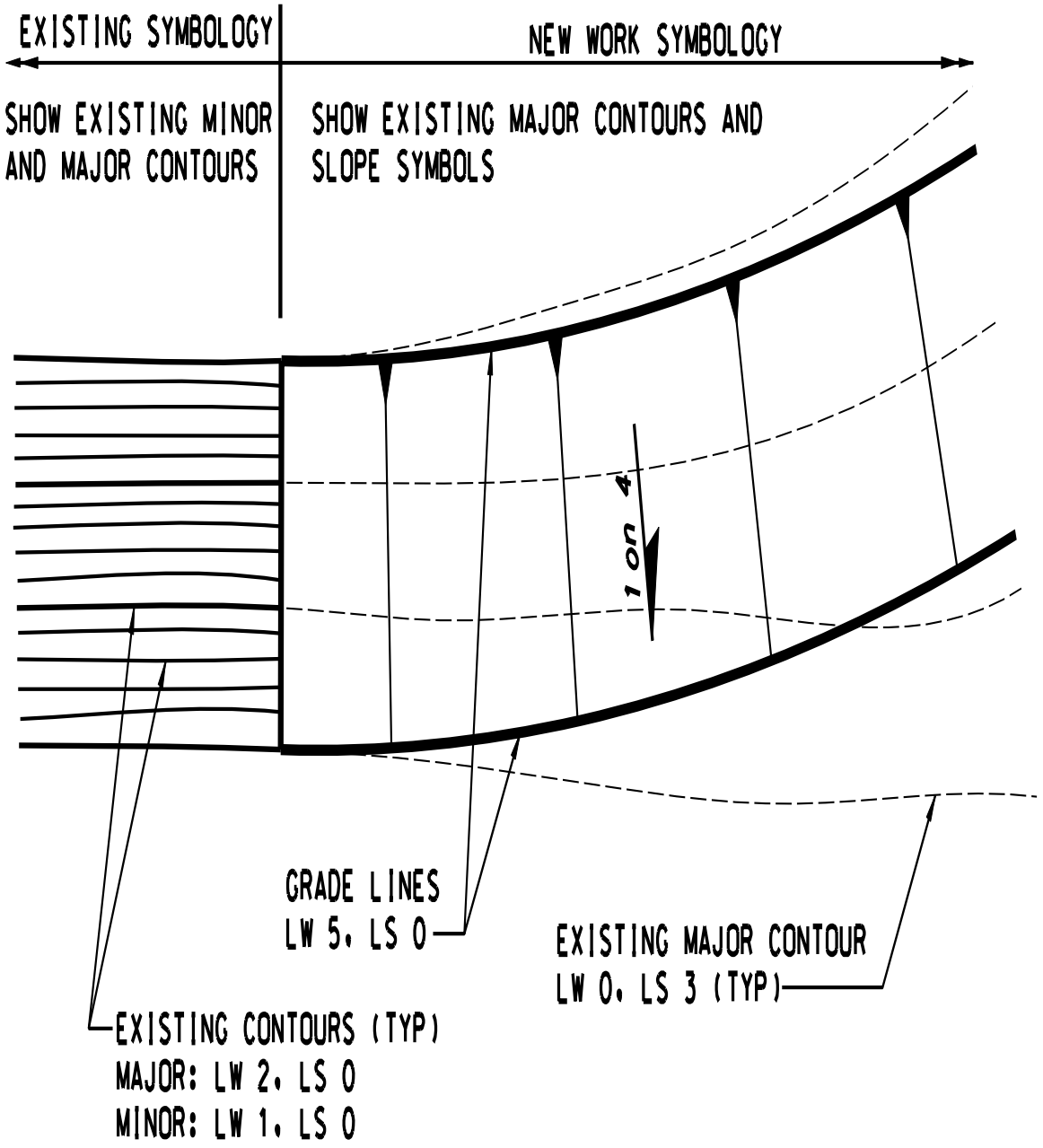
NOTES:

1. GIVE SLOPE AS RATIO OF THE VERTICAL RISE ON A HORIZONTAL DISTANCE.
2. NEW WORK WILL BE STRAIGHT LINES.
3. VARY SPACING OF SLOPE LINES TO SUIT SCALE OF DRAWING.



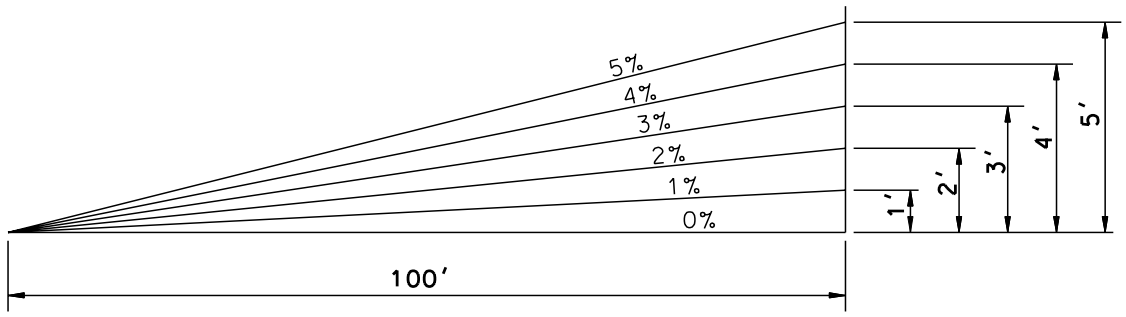
GRADES

Figure 6-10



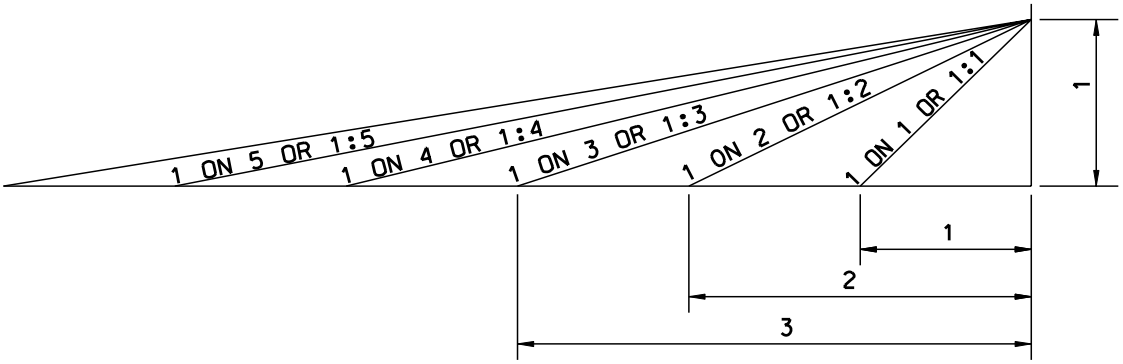
TOPOGRAPHICAL SYMBOLOGY

Figure 6-11



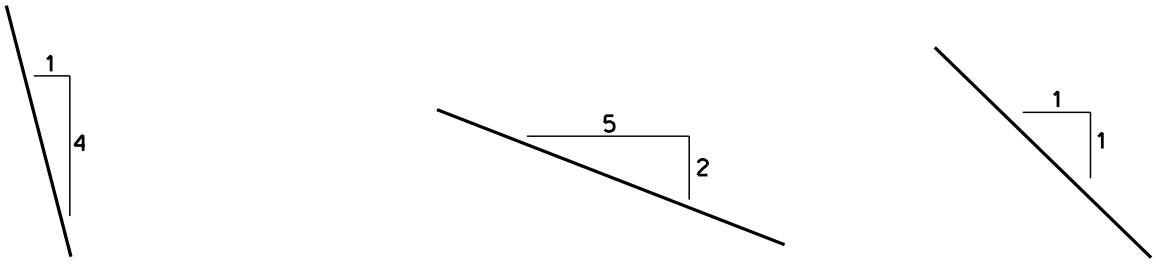
1% SLOPE RISE 1' IN DISTANCE OF 100'
2% SLOPE RISE 2' IN DISTANCE OF 100'
2.5% SLOPE RISE 2½' IN DISTANCE OF 100'
2.75% SLOPE RISE 2¾' IN DISTANCE OF 100'

PERCENTAGE



1 ON 1 OR 1:1 SLOPE RISE 1' IN DISTANCE OF 1'
1 ON 2 OR 1:2 SLOPE RISE 1' IN DISTANCE OF 2'
1 ON 3 OR 1:3 SLOPE RISE 1' IN DISTANCE OF 3'

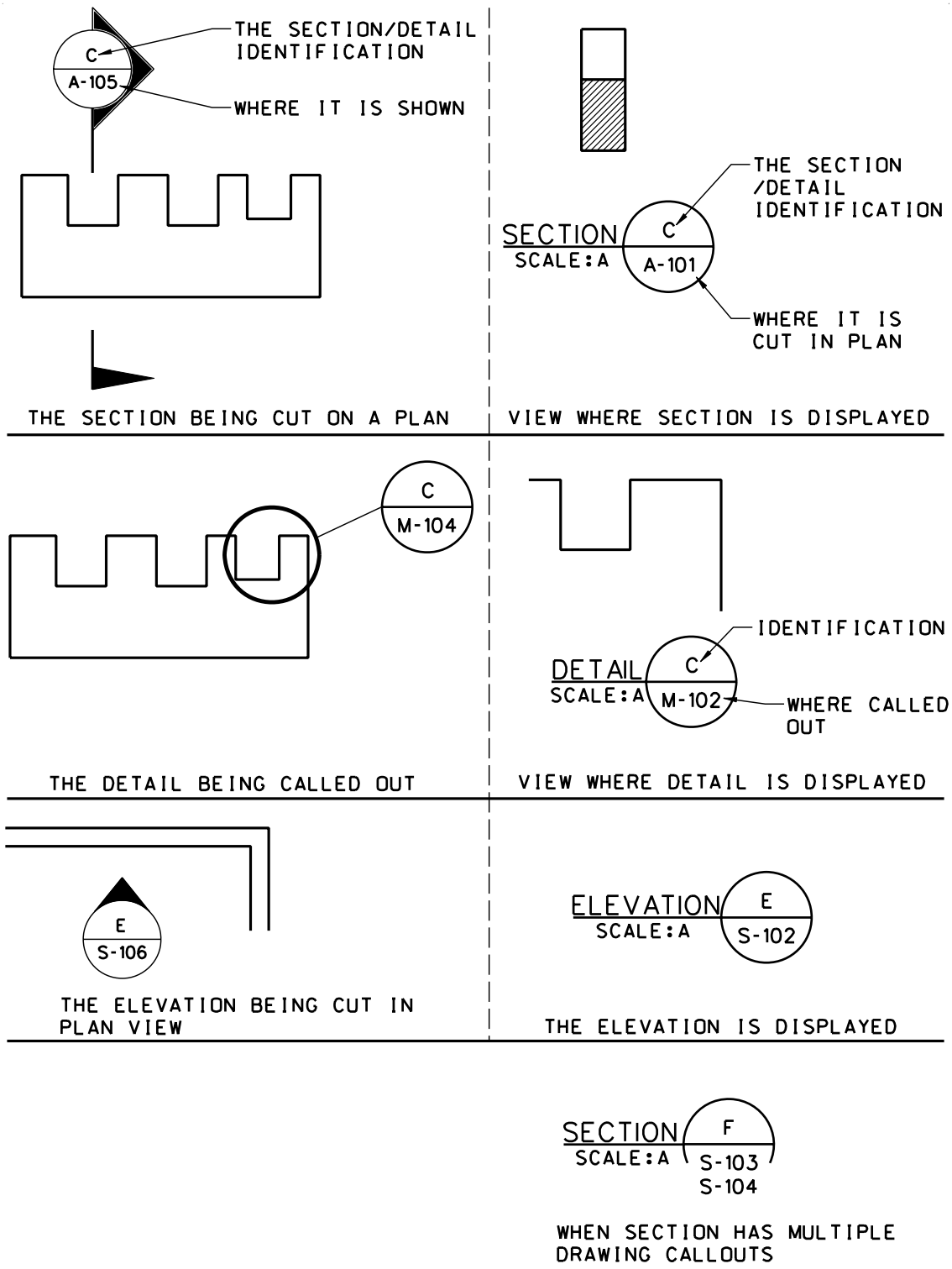
RATIO



ILLUSTRATION

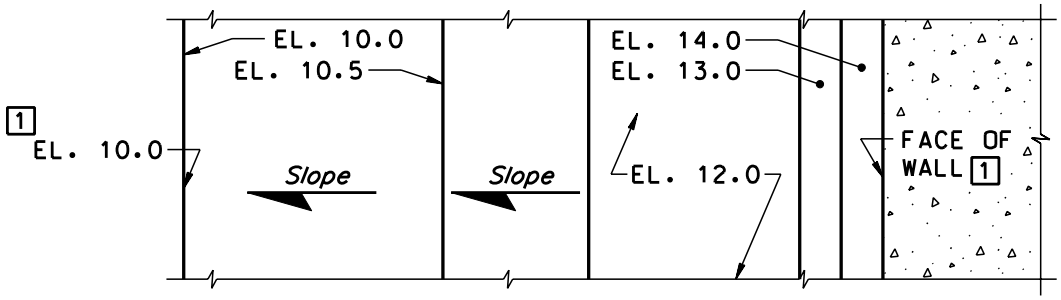
SLOPE EXPRESSIONS

Figure 6-11

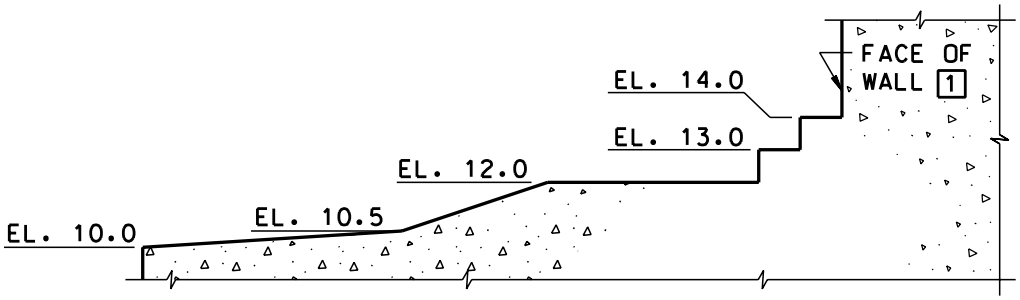


DETAIL AND SECTION CALLOUTS

Figure 6-12



PLAN VIEW



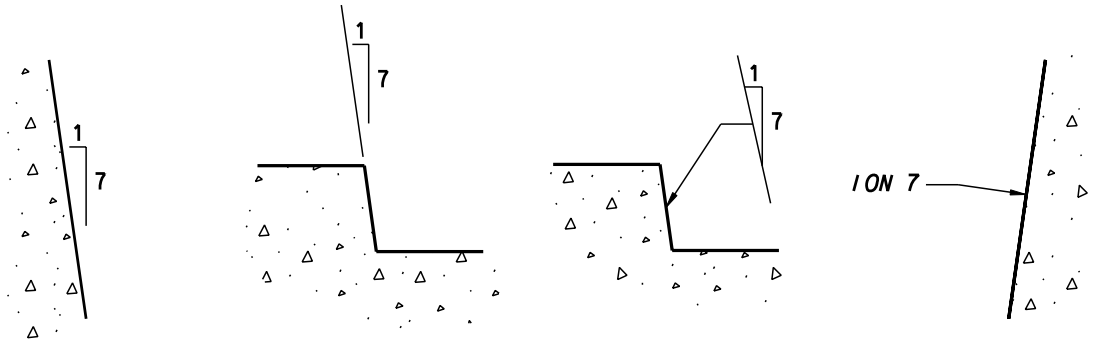
SECTION VIEW

KEY NOTES:

1 ONLY FOR CROWDED CONDITIONS.

ELEVATION (HEIGHT) INDICATIONS

Figure 6-13

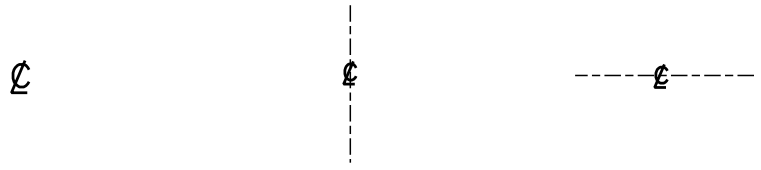


SECTION OR ELEVATION

BATTER

NOTES:

1. GIVE BATTER AS A RATIO OF THE VERTICAL RISE TO THE HORIZONTAL OFFSET.
2. APPLICABLE FOR CONCRETE WORK OR ROCK EXCAVATION.



CENTERLINE INDICATIONS

NOTES:

1. SIZE OF THE "C" SHOULD BE EQUAL TO THE TEXT SIZE.

Figure 6-14